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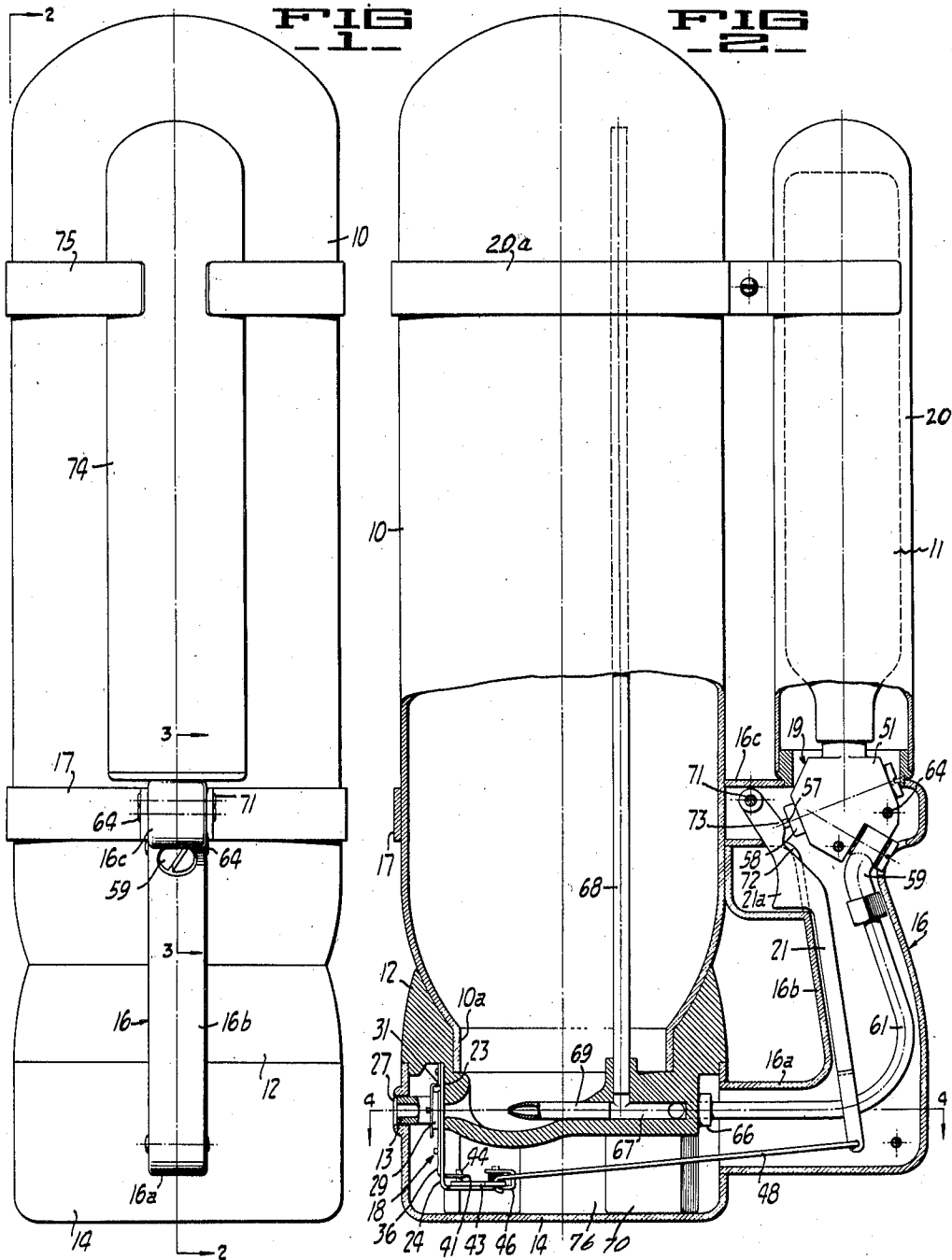
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2,338,313

FIRE EXTINGUISHING APPARATUS

Filed June 20, 1941

2 Sheets-Sheet 1



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FIG. 3

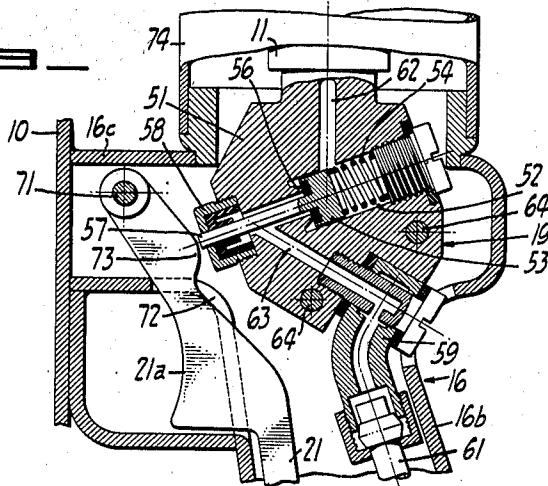


FIG. 4

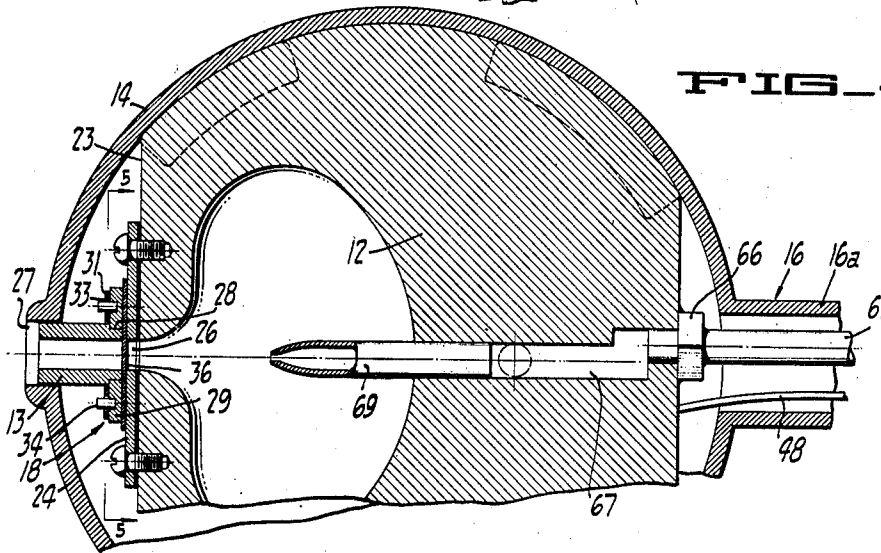


FIG. 5

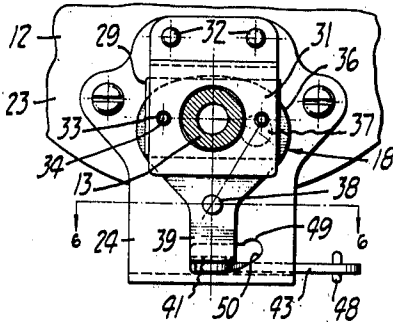
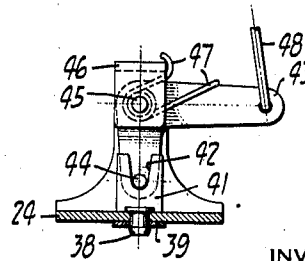


FIG. 6



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FIRE EXTINGUISHING APPARATUS

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9 Claims. (Cl. 169—31)

This invention relates generally to portable fire extinguishers of the dry powder chemical type.

It is an object of the invention to generally improve upon apparatus of the above character, particularly with respect to controlling the discharge of powder.

Another object of the invention is to provide an effective portable extinguisher of the dry powder chemical type, which can be readily operated by anyone without previous experience, and which can be readily recharged.

Another object of the invention is to provide a novel valve means for use in conjunction with such apparatus, including particularly a valve for controlling the discharge of powder which will not become clogged by powder and which will automatically relieve excess pressure.

Additional objects of the invention will appear from the following description in which the preferred embodiment has been set forth in detail, in conjunction with the accompanying drawings.

Referring to the drawings:

Figure 1 is an end elevational view showing a device incorporating the present invention;

Figure 2 is a side elevational view of the device shown in Figure 1, with certain parts shown in cross section;

Figure 3 is an enlarged cross sectional detail taken along the line 3—3 of Figure 1;

Figure 4 is a cross sectional view on an enlarged scale, taken along the line 4—4 of Figure 2;

Figure 5 is a cross sectional detail taken along the line 5—5 of Figure 4; and

Figure 6 is a cross sectional detail taken along the line 6—6 of Figure 5.

The apparatus illustrated in the drawings consists generally of a chamber 10 for containing a charge of dry fire extinguisher powder, a cartridge 11 for containing gas such as carbon dioxide under relatively high pressure, and a lower base or body 12. Chamber 10 can be cylindrical shaped as illustrated, with its upper end closed, and with its lower end portion 10a of reduced diameter and fitted within the body 12. When in use powder is discharged from the nozzle 13.

The lower side of the body 12 is enclosed by the shell 14, which can conveniently be made of pressed metal. This shell also forms a lower end surface upon which apparatus can be supported when it is not in use. Attached to one side of the shell 14, there is a structure 16 which forms a pistol like grip. Structure 16 can be formed of pressed metal or other suitable material, and it is made hollow to house certain parts to be presently described. A lower extension 16a forms an attachment to shell 14. Portion 16b forms a grip or handle to be engaged by the hand of an operator. An upper portion 16c is

attached to releasable clamping band 17, which surrounds the chamber 10.

Two valves 18 and 19 are provided. Valve 18 serves to control discharge of powder through the nozzle 13, and valve 19 serves to control release of gas from the cartridge 11. As will be presently explained, both of these valves are operated by a common manual operating member, which is preferably in the form of a lever 21. Cartridge 11 can be housed within a removable casing 20, the upper part of which is engaged by the releasable clamp 20a.

While the design of valve 18 can vary, it is desirable to have a simple valve mechanism which will not become clogged by the presence of powder, and which will afford a sufficiently tight shut-off to hold some gas pressure in chamber 10 for a short period of time such as, say, for a few minutes, without securing a gas tight seal. Also, it is desirable that this valve automatically relieve an excessively high pressure in chamber 10. The valve illustrated in Figures 4 to 6 inclusive accomplishes all of these results, and is constructed as follows: A part of the body 12 is shaped to provide the flattened surface 23 upon which the plate 24 is mounted. This plate has an opening 25 in alignment with the passage of the nozzle 13. Nozzle 13 is in the form of a short tube, loosely extending into an opening 27 of the shell 14. The inner end of the nozzle tube terminates short of plate 24, and has a portion 28 of reduced diameter. Fitted upon portion 28, there is a follower plate 29 which is yieldably urged toward plate 24 by the spring 31. Spring 31 is mounted on plate 24 as by means of rivets or screws 32, and it has openings 33 which loosely accommodate the pins 34, mounted upon the follower plate 29.

Between the follower plate 29 and the adjacent face of plate 24, there is a valve member 36 in the form of a piece of relatively thin sheet metal, provided with a port opening 37. Pivot pin 38 serves to pivotally attach the valve member 36 to the mounting plate 24, and a depending arm 39 is attached to means whereby the valve member 36 can be rocked between open and closed positions. Thus, the lower end of arm 39 is provided with a laterally bent portion 41, provided with a slot 42. An L lever 43 has its one arm provided with a pin 44, which engages within slot 42. L lever 43 in turn has a pivotal connection 45 to a bracket 46, which can be an integral lateral extension from the lower end of the plate 24. A spring 47 serves to urge L lever 43 in a clockwise direction as viewed in Figure 6. By pulling link or rod 48 attached to the L lever 43, the valve member 36 can be rocked in a counter-clockwise direction as viewed in Figure 5, to move the same from closed to open position, at which time the port 37 is placed in registry with the

passage of the nozzle tube 13. A shoulder 49 in a slot 50 forms a stop to limit rotation of the valve member 36 in a counterclockwise direction as viewed in Figure 5.

The valve 19 for controlling release of gas from cartridge 11 can likewise vary as to detail, although a desirable construction is illustrated in Figure 3. Briefly, the valve consists of a body 51 directly attached to the neck of the cartridge 11. The interior of this body is provided with a bore 52, to accommodate the valve member 53. The valve member is urged by compression spring 54 against the stationary seat 56. An operating stem 57 is attached to valve member 53 and extends to the exterior of the body 51, through the sealing gland 58. A coupling 59 is detachably secured to the body 51, and serves to make detachable connection with the tube 61. A duct 62 in the body 51 accommodates flow of gas from the cartridge 11 to the bore 52, and duct 63 permits flow of gas to the coupling 59 and tube 61 when the valve is opened. The valve body 51 is attached to the side walls of the structure 16 by means of one or more screws or bolts 64. To conveniently detach coupling 59, there is an opening in the adjacent wall of structure 16 through which a screw driver or like tool can be inserted to loosen the attaching screw of the coupling.

As shown in Figure 2, tube 61 extends downwardly through the structure 16 into the shell 14, where it is attached by fitting 66 to the body 12. Duct 67 in the body 12 serves to distribute this gas to the tubes 68 and 69. Tube 68 extends upwardly to a point near the upper end of the chamber 10, while tube 69 has a restricted discharge orifice, which is in alignment with the discharge nozzle 13. Thus, compressed gas delivered through tube 61 is applied upon top of the charge of powder in chamber 10, and is also discharged as a jet from tube 69, to agitate the powder and to cause a jet of gas together with entrained powder to discharge through the nozzle 13, assuming that the valve 18 is in open position.

With respect to the means for operating the valves 18 and 19, lever 21 has a pivotal connection 71 with the extension 16c. Portion 21a of this lever extends through a slot 72, and is trigger shaped so that it can be readily engaged by the finger of an operator. Above lever portion 21a the lever is provided with a cam surface 73, which engages the outer end of the valve rod 57. Thus, when lever 21 is moved rearwardly, rod 57 is cammed inwardly to move the valve member to open position. The lower end of lever 21 is pivotally attached to the rod 42, so that rearward movement of the lever effects simultaneous operation of the valve 18.

Chamber 10 can be filled through a suitable opening which is normally closed. For example, a stud 76 extending from the lower side of the body 12 can be provided with a passage accessible through an opening in the bottom of shell 14, and normally closed by a threaded plug.

Operation of the apparatus described above can be reviewed as follows: A charge of suitable fire extinguisher powder is introduced into the chamber 10, and the cartridge 11 is suitably charged with a gas under pressure, such as carbon dioxide. Various fire extinguisher powders are well known to those skilled in the art. Usually such powder contains sodium bicarbonate, together with other ingredients which render the powder free flowing under all atmospheric condi-

tions. Normally both the valves 18 and 19 are closed. To extinguish a fire, the operator grips the pistol grip 15b with one hand, placing a finger upon the lever portion 21a. The other hand of the operator may grasp either chamber 10 or the shell 20 about the cartridge 11.

To expel powder upon the fire, force is applied to lever portion 21a to force the lever 21 to the right, as viewed in Figure 2, and this serves first to open valve 18, and then to open the valve 19 to release gas from the cartridge 11. The released gas jets with considerable force from tube 69, and is also applied on top of the charge of powder through tube 68. As the gas jets through the discharge nozzle 13, it carries a cloud of powder and propels this powder forwardly upon the fire. When pressure is released upon the lever portion 21a to permit the lever to return to the position shown in Figure 2, valve 19 is first closed to interrupt further release of gas, and thereafter valve 18 closes. Valve 18 does not provide a gas tight shutoff, although it will retain some gas pressure in chamber 10 for a short period of time, such as a few minutes.

The apparatus described above has many desirable features. Because of the manner in which both the discharge of powder and gas can be controlled at the will of the operator, the apparatus has maximum fire fighting utility for a given size of equipment. Chamber 10 can be made of light inexpensive metal, because it is not required to withstand relatively high pressures, comparable to the pressures maintained in the small cartridge 11. Operators require no previous training for operation of the equipment, because the proper manner of holding the apparatus and operating the lever portion 21a is obvious.

Valve 18 is of such a character that it will not become clogged by the presence of extinguisher powder. The flat valve member 36 is yieldably pressed between the mounting plate 24, and the follower plate 29. Should any powder find its way between these parts, it will not jam or interfere with movement of the valve member 36, and such powder readily works its way out of the valve. Should there be a breakage such as would occasion building up of an unduly high pressure in chamber 10, the pressure upon the closed plate 36 will force this plate away from contact with the face of plate 24, with the result that the gas will then be discharged into shell 14, and from thence dissipated to the atmosphere.

When it is desired to recharge the apparatus, it is a simple matter to apply a new cartridge 11, simply by removing the screws 64, and by disconnecting the coupling 59. This enables one to bodily remove the cartridge together with the entire valve unit 19. After the cartridge has been recharged with gas, it is re-applied to the apparatus as shown in Figure 1. At the time it is re-applied, the operating pin 57 automatically re-assumes operating position with respect to the cam surface 73.

I claim:

1. In fire extinguishing apparatus of the dry powder chemical type, a chamber for receiving a charge of fire extinguisher powder, a cartridge for containing a charge of gas under pressure, a discharge nozzle for powder communicating with the chamber, a valve serving to open and close said discharge nozzle, a duct aligned with said nozzle and serving to deliver gas from the cartridge to the chamber, whereby all of said powder is discharged through the nozzle with a jet of

gas, a second valve for controlling release of gas from the cartridge, and a common manual operating member for operation of both said valves.

2. In fire extinguishing apparatus of the dry powder chemical type, a chamber for receiving a charge of powdered chemical, a cartridge for receiving a charge of gas under relatively high pressure, a discharge nozzle for powder communicating with the chamber, a duct aligned with said nozzle and serving to deliver gas from the cartridge to the chamber, whereby all of said powder can be discharged through the nozzle with a jet of gas, a valve adapted to be opened and closed for controlling release of gas from the nozzle, a valve adapted to be opened and closed for controlling release of gas from the cartridge, a single operating member movable between released and actuated positions, and a motion transmitting mechanism serving to operatively connect both said valves to said member, said mechanism serving to effect opening of the valve for controlling release of gas, when said member is moved between released and actuated positions.

3. In fire extinguishing apparatus of the dry powder chemical type, a chamber for receiving a charge of fire extinguisher powder, a cartridge for containing a charge of gas under pressure, a discharge nozzle communicating with the chamber, a duct aligned with said nozzle and serving to deliver gas from said cartridge to said chamber whereby all of said powder can be discharged through said nozzle with a jet of gas, and means associated with said nozzle to effect opening and closing of the same, and automatically to effect release of an unduly high pressure within the chamber.

4. In fire extinguisher apparatus of the dry powder chemical type, a chamber for receiving a charge of fire extinguisher powder, a cartridge for containing a charge of gas under pressure, a discharge nozzle communicating with the chamber, a duct aligned with said nozzle and serving to deliver gas from the cartridge to the chamber whereby all of said powder can be discharged through the nozzle with a jet of gas, a valve for controlling release of gas from the cartridge, valve means for controlling opening and closing of the nozzle and for automatically releasing excessively high gas pressure from the chamber, and means including a common manual operating member for effecting operation of both said valves.

5. In fire extinguisher apparatus of the dry powder chemical type, a chamber for receiving a charge of fire extinguisher powder, a body upon which one open end of the chamber is mounted, a structure forming a pistol-like grip mounted upon the body and extending adjacent one end of the chamber, a discharge nozzle carried by the body and communicating with the chamber, valve means carried by the body and serving to control the discharge nozzle, a cartridge for containing gas under pressure attached to one end of the grip structure, a valve for controlling release of gas from the cartridge, a duct extending from said valve through the pistol grip and to the body for communication with said chamber, and actuating means for both said valves including a common operating member associated with said pistol grip.

6. In fire extinguisher apparatus, a body formed to provide a discharge nozzle, a chamber having

its lower open end mounted upon the body with the interior of the chamber in communication with the discharge nozzle, a structure in the form of a pistol grip secured to the body and extending upwardly alongside the lower end portion of the chamber, a cartridge for gas under pressure extending upwardly from the upper end of the pistol grip structure, a valve attached to the lower end of the cartridge, actuating means for the valve carried by the pistol grip structure, said valve being removable from the pistol grip together with the cartridge as a unit, and a detachable pipe connection from the valve to the chamber, whereby gas released from the cartridge and discharged into the chamber causes powder to be discharged from the nozzle together with a jet of gas.

7. In fire extinguishing apparatus of the dry powder chemical type, a chamber for receiving a charge of fire extinguisher powder, a cartridge for containing a charge of gas under pressure, a discharge nozzle for powder communicating with the chamber, a valve serving to open and close the discharge nozzle, a branched duct serving to deliver gas from the cartridge to the chamber, one branch of said duct terminating in an aspirating nozzle aligned with said first discharge nozzle and another branch of said duct terminating at the end of said chamber remote from the discharge nozzle thereof, whereby powder is discharged through the nozzle with a jet of gas and under gas pressure, a second valve for controlling release of gas from the cartridge, and a common manual operating member for operation of both of said valves.

8. In fire extinguishing apparatus of the dry powder chemical type, an upright chamber for receiving a charge of fire extinguisher powder, a cartridge for containing a charge of gas under pressure, a discharge nozzle for powder communicating with the lower end of said chamber, a valve serving to open and close said discharge nozzle, a branched duct serving to deliver gas from the cartridge to the chamber, said duct having one branch discharging adjacent said nozzle in alignment therewith, and having another branch extending upwardly through said chamber and terminating adjacent the upper end thereof, whereby powder is discharged through the nozzle with a jet of gas under gas pressure, a second valve for controlling release of gas from the cartridge, and a common manual operating member for operation of both of said valves.

9. In fire extinguishing apparatus of the dry powder chemical type, a chamber for receiving a charge of fire extinguisher powder, a cartridge for containing a charge of gas under pressure, a discharge nozzle communicating with the chamber, a duct serving to deliver gas from said cartridge to said chamber whereby powder can be discharged through said nozzle with a jet of gas, a valve controlling opening and closing of said nozzle, said valve comprising a valve member mounted for movement laterally across said nozzle, said member normally closing said nozzle and having an aperture movable into alignment with said nozzle, and means yieldably urging said valve member to close said nozzle opening, said valve member being yieldable without movement to operative position to release unduly high pressure within the chamber.

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